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24 OCT. 1932

THE

ADVISORY DEPARTMENT

IMPERIAL COLLEGE OF TROPICAL AGRICULTURE.

REPORT

ON THE

Agricultural Department

ST. KITTS-NEVIS

1931.

ISSUED BY THE COMMISSIONER OF AGRICULTURE

FOR THE WEST INDIES.

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[Price Sixpence.]

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Letter of Transmittal.

COPY.

C. A. 608.

16th August, 1932.

Sir,

I have the honour to transmit the Report of the Agricultural Department, St. Kitts-Nevis, for the period April to December, 1931.

2. The extreme drought of 1930 was broken by a good rainfall in April, 1931, and for the remainder of the year the rainfall was well above the average for St. Kitts.

3. The sugar crop of St. Kitts reaped in 1931 amounted to 12,000 tons of sugar reaped from 6,000 acres. The crop prospects which are reported on as being very favourable during the period under review were continued through the 1932 reaping season when a record crop of nearly 20,000 tons of sugar were made in St. Kitts.

4. The crop of 1931 was the lowest in a ten-year period and that for 1932, according to returns made available since the Report was prepared, constitutes a high record for the history of the Island.

5. The cotton crop in St. Kitts in 1931 suffered from the dry weather at the time of planting. Consequently the planting and supplying of the crop extended over an unusually long time and, as a result, the effect of the pink bollworm attack was more severe than usual. The cotton caterpillar was abundant and persistent and the crop suffered rather seriously from insect attack. Unusually heavy rains later in the season when the crop was maturing caused further losses and the return was very small, being only about 111 pounds per acre.

6. An extract from an interesting report by Mr. H. E. Box is included. The report indicates that Mr. Box has carried out a large amount of general work on the moth borer of the sugar cane and its local food plants, and on the status of its egg parasite (*Trichogramma minutum*).

7. The work of introducing and establishing the Cuban Tachniid fly (*Lixophaga diatraeae*) for the control of the moth borer in being carried on and with strong hopes that it will greatly reduce the borer attack.

8. In Nevis the 1930-31 cotton crop was considerably reduced by attacks of pink bollworm and perhaps to some extent by the cotton caterpillar and stainers. The yield from 1,500 acres being only about 106 pounds per acre.

9. The production of live stock is of importance in Nevis, but there is still no adequate provision for supplying water and fodder in the dry season. This requires capital and organization, and is a line that should be investigated. The matter of markets is, of course, of prime importance.

10. The general depression would appear to be reacting on the progress of the land settlement scheme in Nevis. The lack of markets for Sea Island

Cotton, and the absence of any other money crop deprives the intending settler of the means of making his payments as these become due.

11. The report of the Agricultural Instructor, Anguilla, indicates that useful work is being done in that small island. Beans are apparently severely attacked by pests. Onions and Irish potatoes are reported as doing well. These may prove of value as crops to Anguilla.

I have the honour to be,

Sir,

Your obedient servant,

(Sgd.) H. A. BALLOU,

Commissioner of Agriculture,

Imperial College of Tropical Agriculture.

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STAFF OF THE AGRICULTURAL DEPARTMENT, ST. KITTS-NEVIS.

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Assistant Agricultural Officer (July, 1931) ..	G. B. Gregory, D.I.C.T.A., (Trinidad)
Agricultural Instructor, Nevis	W. I. Howell.
Agricultural Instructor, Anguilla	E. O. R. Lake.
Assistant Clerk, St. Kitts (to 14th August, 1931)	R. Lance.
Assistant Clerk, (from 15th August, 1931)	M. M. Marsh.

Report on the Agricultural Department St. Kitts-Nevis

For the nine months 1st April to 31st December, 1931.

Distribution of Plants and Seeds.

The distribution of plants during the period under review was as follows:—

Ornamental trees and plants	532
Julie Mango	114
Avocado Pear (grafted)	10
Orange (budded)	48
Grapefruit (budded)	24
Lime	8
Pineapple suckers	5,000
Papaw	38

SEEDS.

Cotton Seed	9,475 lbs.
Onion Seed	20 lbs.
Tomato Seed	14 lbs. 2 ozs.
Vegetable Seeds	336 pkts.
Sugar Cane cuttings	21,282

INTRODUCTION OF PLANTS.

5,000 pineapple slips of the Red Spanish variety were introduced from Porto Rico. The sweet potato variety Bert was introduced from Antigua and the two varieties of Yam, Oriental and Langy, from Barbados.

Seeds of *Alysicarpus rugosus* were received from the Commissioner of Agriculture for trial as a green dressing crop. The plants made good growth with a bushy habit and stood up very well to dry conditions. A quantity of seed has been saved for further trial.

EXPERIMENTS WITH VEGETABLES.

TOMATOES.

Observation plots of the following varieties of Tomatoes were grown:—

Variety.	Origin of Seed.	Remarks.
Alacrity (O—3531) ..	Experimental Farm, Ottawa, through the Commissioner of Agriculture.	Fruit not uniform in shape. Productivity low.
(B.B. x A.P.3) x BB. O—6374—5 P.12 ..	,, ,,	,, ,,
Bb x Bba 6373—10 P. 15	,, ,,	This appeared to be the most suitable of these varieties for St. Kitts' conditions. Seed retained for further trial.
Lgbb No. 5376 ..	,, ,,	Shape of fruit not uniform and low yielder.
Alacrity 39.1 O.4865 ..	,, ,,	,, ,,
L.G. x B.B. O.1816 ..	,, ,,	,, ,,
Alacrity O—3531 ..	,, ,,	,, ,,
Master Marglobe ..	Stokes Seed Co., through the Commissioner of Agriculture.	This appeared to be an excellent variety. Fruit very uniform in shape with very few growth cracks.
Teneriffe	Seed received from the Commissioner of Agriculture.	Vines very vigorous and prolific. Fruit uniform in shape but too small for the Canadian market. The fruit is similar in size to most of the English varieties of tomatoes and would be suitable for the English market.
Fruit Tomato	Carter Seed Co., England.	Fruit very solid and a fairly heavy yielder.
Essex Wonder	MacDonald Seed Co., Canada.	Fruit too small.
Scotch Tomato	Curator, Montserrat ..	Fruit too small. Heavy yielder.
Brimmer	Wood Seed Co. ..	Vines very susceptible to wilt. Fruit cracked badly.

VARIETY AND SPACING TRIAL WITH TOMATOES.

A variety and spacing experiment with tomatoes was carried out according to the plan recommended by Mr. D. D. Paterson of the Imperial College of Tropical Agriculture, Trinidad.

Four varieties were included in this trial. Marglobe and Livingston Globe representing the Globe group and Bonny Best and John Baer representing the Bonny Best group.

The following spacings were used:

4 ft. ridges with 3 ft. planting

4 ft. „ „ 2 ft. „

3 ft. „ „ 2 ft. „

The lay out of the experiment consisted of four randomised blocks of twelve plots each. Each plot was 31 ft. by 19 ft. in area. There was not sufficient land available to permit the use of five blocks as recommended by Mr. Paterson.

The seed was obtained from the Wood Seed Co. of Virginia and was sown on the 30th October and the plants were set out in the field on the 13th November. An application of complete fertilizer was given to the plants about a week after they had been put out in the field. All the plots were supplied twice. Weeding was done weekly until picking commenced. Picking was started on the 21st December, 1931 and was stopped on the 4th February, 1932.

The plots were picked once a week. The weights of total fruit picked and marketable fruit were recorded. The percentage of each of the three grades of fruit required by the Canadian market was also recorded.

The results are given in the following table:

TOMATO VARIETY AND SPACING EXPERIMENT, ST. KITTS. SUMMARY OF RESULTS.

Treatment.	Total yield in lbs. of all plots of any given treatment.	Mean yield of treatment in short tons per acre.	Standard Error of treatment means.	Varieties.	Total yield in lbs. of all plots of any given variety.	Mean yield of variety in short tons per acre.	S.E. of variety means.	Spacing.	Yield in lbs. of all plots of any spacing.	Mean yield for spacing in short tons per acre.	S.E. of spacing means.
M. 4 x 2 ..	367	3.53	0.409	Marglobe ..	1070	3.43	0.236	4′ x 3′	1642	3.95	0.205
L. 3 x 2 ..	422	4.06		Liv. Globe ..	1308	4.19		4′ x 2′	2062	4.96	
L. 4 x 3 ..	374	3.60		Bonny Best ..	1575	5.05		3′ x 2′	1903	4.57	
J. 4 x 3 ..	525	5.05		John Baer ..	1654	5.30					
M. 3 x 2 ..	382	3.67									
B. 4 x 2 ..	574	5.52									
J. 4 x 2 ..	609	5.86									
B. 3 x 2 ..	579	5.57									
M. 4 x 3 ..	321	3.09									
B. 4 x 3 ..	422	4.06									
J. 3 x 2 ..	520	5.00									
L. 4 x 2 ..	512	4.92									

TOMATO VARIETY AND SPACING EXPERIMENT.

Analysis of Variance.

Variance due to	Degrees of Freedom	Sums of Squares.	Mean Sum of Squares.	½ Log E Variance.
Blocks ..	3	3905.9	1302.0	
Variety ..	3	17707.7	5902.6	4.3416
Spacing ..	2	5620.8	2810.4	3.9706
Interaction ..	6	2570.1	428.4	
Error ..	33	14962.8	453.4	3.0584
Total ..	47	44767.3	952.5	

The analysis of variance was carried out on the total weight of fruit picked from the different plots and not on the weights of marketable fruit.

Conclusions.

The varieties Bonny Best and John Baer, under the conditions of this experiment, proved to be heavier yielders than the two Globe varieties. The Marglobe variety was grown on a commercial scale in St. Kitts this season and from certain reports received it appears that this variety is a better shipper than the Bonny Best.

As regards spacing 4′ by 2′ gave yields that are significantly better than 4′ by 3′. The difference in yield of spacings 4′ x 2′ and 3′ x 2′ are not significant.

No conclusive results were obtained for interaction between spacing and variety.

TRIALS WITH OTHER VEGETABLES.

Trials were carried out with the following vegetables:—

Cabbage. The following varieties produced very solid heads of medium size and can be recommended to growers: All Head Early, Copenhagen Market and Early Jersey Wakefield.

Cauliflower. Seeds of an Indian variety of this vegetable were again imported from Trinidad and some very satisfactory "heads" were produced. The demand for this vegetable is increasing.

Egg Plant. Black Beauty, New York Purple and a variety known as Blackie, seeds of which were obtained from the Government Experimental Farm, Ottawa, through the Commissioner of Agriculture. Black Beauty was found to be the most suitable variety for the Canadian market. The colour and size of fruit of the variety Blackie were not up to the standard of Black Beauty.

Government Cotton Seed Farm

On account of the severe drought in March the 1931 crop was not established until about the 15th April. The yield of cotton was very low and the percentage of stained cotton high as a result of severe attacks by the cotton leaf worm (*Alabama*), early infestation with pink bollworm and heavy rainfall when the crop was maturing.

The total amount of seed cotton picked was 35,644 lb. which yielded 6,203 lb. clean lint and 1,618 lb. stained cotton. The yield was about 130 lb. lint per acre. The stained cotton amounted to about 20 per cent. of the cotton picked.

WORK CONNECTED WITH INSECT AND FUNGUS PESTS AND THEIR CONTROL.

SUGAR CANE.

Gumming Disease.

The position with regard to gumming disease is satisfactory. The two main varieties under cultivation, B.H.10.12 and S.C.12.4, are highly resistant to the disease. At the Experiment Station small leaf markings were found on the variety P.O.J.2878 but no stem infection was observed. Leaf symptoms were fairly general on the variety B.726 and this variety will not be extended until something more is known about its resistance to gumming. The varieties B.417, B.381, B.374 and G.119 appear to be very resistant to this disease.

Mosaic Disease.

This disease was not observed during the period under review.

Moth Borer (*Diatraea saccharalis,* Fabr.)

This insect was very prevalent and continued to cause serious damage to the cane crop.

COTTON.

The cotton leaf worm (*Alabama argillacea*) was very prevalent in all parts of the island and did severe damage to the cotton crop. Considerable quantities of insecticides were used in the efforts made to control it. Showery weather during periods of attack made control measures difficult and expensive.

The larvae of the pink bollworm (*Pectinophora gossypiella* Saund.) were found on cotton flowers at the Government Cotton Farm about sixty days after planting. This pest was found very early in nearly all cotton fields and a high percentage of first crop bolls were lost by its attacks.

It is possible that the early infestation of the crop by this insect was the result of infection from Nevis where the second crop bolls were heavily infested with pink bollworm at this time.

PROGRESS IN CHIEF INDUSTRIES.

THE SUGAR CANE INDUSTRY.

The season of growth of the 1929-31 sugar cane crop was very unfavourable. The average rainfall of October, November and December, 1929, was 18.02 inches, the germination of the plants was good and there was no difficulty in

getting the crop established. The average rainfall of 1930 was 45.98 inches of which 21 inches fell in January, November and December. There was a severe drought from February to September and the crop suffered severely. Yields were very low on nearly all estates.

For the 1929-31 crop 6,096 acres of cane were reaped and the Basseterre Factory manufactured 12,021 tons of grey crystal sugar from 98,228 tons of cane. The average yield of the island was 16.11 tons of cane and under 2 tons of sugar per acre. The average price obtained for the sugar was £9.10. 2. per ton which was 10/- less than the price obtained in 1930. Growers again received 14/- per ton for their cane.

For the 1930-32 crop about 6,300 acres of cane will be reaped. Weather conditions in 1931 were favourable and the crop is estimated at 18,000 tons of sugar.

The following varieties of cane are under cultivation: B.H.10.12, S.C. 12.4, P.O.J.2878, P.O.J.2725, B.417, B.374, B.381, G.119, B.726. Cuttings of the varieties B.891 and B.831 have now been distributed to nearly all estates.

MANURIAL EXPERIMENT WITH SUGAR CANE.

The manurial plots at Molineux estate will not be reaped until April, 1932, and the results will therefore not be available for inclusion in this report.

VARIETY TRIAL WITH SUGAR CANE.

The variety experiment with plant canes, which was laid down at Molineux Estate in October 1930, was reaped in February, 1932 and as the results are available at the time of writing this report they have been included.

The following seven varieties were included in the trial: P.O.J.2725, B.H.10(12), S.C. 12.4, B.381, B.726, B.374 and B.417.

The lay-out of the experiment was a latin square with seven replicates of each variety.

The soil on this estate is a light sandy loam. The experimental field received a dressing of about 25 tons of pen manure per acre. During growth the experimental canes were given normal estate cultivation.

The lining of the field was 5 feet by 4 feet and each plot contained 100 holes of cane of which 64 holes (0.03 acre) were weighed at the time of reaping. A fifty pound sample of cane from each plot was ground in the experimental mill at the experiment station and the juice analysed.

The canes were planted in October, 1930 and reaped in February, 1932. The rainfall during the experimental period is given below.

October, 1930	5.55 inches	June	6.24 inches
November	11.32 ,,	July	5.07 ,,
December	4.16 ,,	August	6.93 ,,
January, 1931	1.43 ,,	September	7.08 ,,
February	1.56 ,,	October	5.89 ,,
March	1.30 ,,	November	10.38 ,,
April	6.20 ,,	December	5.43 ,,
May	8.06 ,,	January, 32	7.22 ,,

RESULTS OF VARIETY EXPERIMENT WITH PLANT CANES AT MOLINEAUX ESTATE.

PLANTED OCTOBER, 1930. REAPED FEBRUARY, 1932.

Variety.	Means for						
	No. of Plots & analyses	Cane, Tons per Acre.	Extraction per cent.	Sucrose in Juice. lbs. per gallon.	Purity.	Sucrose in Juice. lbs. per acre.	Sucrose in Juice. tons per acre.
P.O.J. 2725	7	41.58	59.6	1.612	88.5	8,410	3.75
B.381 ..	7	38.77	59.1	1.747	90.1	8,400	3.75
B.H.10. 12	7	38.40	60.7	1.651	90.3	8,100	3.61
S.C. 12.4	7	37.23	58.6	1.768	91.3	8,240	3.67
B.374 ..	6	36.32	56.8	1.755	90.1	7,570	3.38
B.417 ..	7	35.51	58.9	1.786	91.7	7,810	3.49
B.726 ..	7	28.37	57.8	1.769	91.4	6,070	2.71
Means of all ..		36.66	58.9	1.727	90.5	7,800	3.48

Standard Error of difference between variety means by analysis of variance .. .. 1.65 tons of cane per acre.

Significant difference between mean yields of any two varieties (S.E. x 2) .. .. 3.30 tons of cane per acre.

CONCLUSIONS.

With the environmental conditions of soil and season under which this experiment was conducted it appears that the yield of P.O.J.2725 is significantly above the average. B.381, B.H.10.12 and S.C.12.4 are good yielding varieties. There was considerable difficulty in getting B.726 established and it would not be advisable to draw conclusions regarding this variety at present.

The sucrose content of all the varieties is low and it is probable that as a result of the heavy rainfall in December and January the canes were immature at the time of reaping.

Two other variety experiments were laid down in October, 1931 at Molineux and Buckleys estates. The following varieties have been included in these trials; B.H.10.12, S.C.12.4, B.417, P.O.J.2878, G.119, B.726 and B.374. The lay-out consists of four randomised blocks.

EXTRACT FROM A REPORT BY MR. H. E. BOX, F.E.S., ENTOMOLOGIST, ON A VISIT TO ST. KITTS IN FEBRUARY 1932.

St. Kitts:—The general conditions of cane cultivation in St. Kitts are strongly suggestive of parts of Porto Rico, though, due to local conditions, particularly in the nature of the soil, the system of agriculture is somewhat different. The writer was much impressed by the high standard of cane cultivation, to which, as well as the generally favourable climate, the consistently good yields per acre are unquestionably due, the attention given to the preparation of the land to manuring, and to rotation, is specially noticeable, and is probably the reason why canefields in St. Kitts are singularly free of the ravages of Root-disease. A large number of fields, however, in various parts of the island, were found to be suffering from the fungus *Melanconium sacchari*, which causes the dry rot known as "Rind Disease." In some areas, indeed, the loss through this cause is extremely serious and warrants early attention for its control. There is little doubt that this disease is secondary in its attack upon the canes, following upon primary lesions to the stalks caused by the moth-borer (*Diatraea saccharalis*) and the Weevil Borer (*Metamasius hemipterus*). The exact relations between borer attack and the incidence of rind disease have not been thoroughly investigated, but there is no doubt that certain factors—probably climatic—in St. Kitts favour the development of the fungus to a degree that is extremely rare in Antigua, where *Melanconium sacchari* occurs, but only occasionally serious. More care is needed in St. Kitts towards the question of the selection of cuttings for planting, for in several places the writer noticed planted cuttings which were infected with rind disease (*Melanconium sacchari*) as well as pine-apple disease (*Theilaviopsis ethaceticus*) and Red Rot (*Colletotrichum falcatum*) all three of these diseases gain entry through the medium of borer tunnels, so that it is advisable to reject all cuttings showing signs of borer damage. The proper selection of only perfectly sound healthy cuttings for planting and their disinfection before being put into the ground, would do much to reduce the losses due to cane diseases in St. Kitts, and would undoubtedly increase the already good yields obtained there.

As noted by Dr. Myers, the principal varieties grown are B.H.10(12) and S.C. 12/4, of which the former is the favourite; both are splendid varieties and well suited to the conditions of the island. A few fields of other varieties were seen by the writer, notably some of the P.O.J.2878, which is losing favour because of its tendency to early-arrowing and the fact that it is highly susceptible to borer attack; another variety noticeably more attacked than the standard canes is B.417, of which one field was seen and examined.

The harvesting season commenced at the time of the writer's visit, and a large number of fields were examined so as to gain an idea of the prevalence of *Diatraea* infestation. Most of the plant fields for the 1933 crop were established, though a certain amount of "supplying" was in progress here and there; a few fields on most of the estates were left for later planting.

The fields of young plants (October—December) seemed to be in excellent condition, and there was a striking absence of "dead-hearts" due to borer attack, indeed, in only one field seen was a quantity of "dead-hearts" noted sufficient to enable counts to be made for estimating parasitism by the native larval parasite *Microdus stigmaterus*. There is every reason to believe, however, that as neighbouring fields are harvested, the young plant canes will become infested by migrating adults of *Diatraea*.

Status of Diatraea saccharalis in St. Kitts.—A few fields of corn (maize) were examined, and found to be slightly infested with *Diatraea*; 100 stalks cut open and examined yielded 15 borers in various stages of development (larvae and pupae), no larval parasites (*Microdus*) were found.

In sugar-cane, the borer is extremely serious. Because of the relative freedom of young plants from borer attack, mature or nearly mature fields only

were used to determine the prevalence of *Diatraea* in the island; all of the chief cane-growing areas were visited, and examinations made of typical fields in representative estates. In 27 of these actual counts were made to determine the percentage of stalk and joint infestation, the latter figure giving a very good index to the amount of sugar lost per ton of cane. The results are tabulated in Appendix 1, from which it will be seen that the average infestation of all fields thus examined is 79.7% of the stalks and 11.8 of the joints, there being an average of 3.5 joints bored on each bored stalk. These figures do not differ materially from those representing the Antigua crop for 1932 harvest, except that the infestation of joints is somewhat lower (16.0% in Antigua), obviously due to the increased number of points per individual cane in St. Kitts.

The writer would hesitate to draw definite conclusions from the examination of a very limited number of fields of each category but there is some indication that the B.H.10(12) cane is more heavily attacked than the S.C.12/4. There is no doubt, on the other hand, that other factors being the same—ratoons are considerably less attacked than are plants:—

Variety and Class of Cane.	No. of Fields.	Infestations %. Stalks.	Joints.	Intensity Index.
B.H.10(12)—plants ..	10	85.0	15.1	5.3
„ —ratoons ..	7	53.6	8.9*	2.9
Average ..	(17)	75.0	12.6	4.3
S.C.12/4—plants ..	5	70.6	8.8	2.9
„ —ratoons ..	4	64.5	5.5	2.2
Average ..	(9)	67.6	7.5	2.6

It may be mentioned that in several instances adjoining fields of plants and ratoons were examined and in such cases the ratoons were invariably less attacked than the plants. This was especially noted at Belmont estate, where on one side of the road a field of B.H. 10(12) plants was severely attacked 100 % of the canes, whereas on the other side of the road a field of 3rd ratoons of the same variety was so slightly attacked that it was difficult to find a bored stalk.

Insufficient data are available to enable one to postulate upon the relative infestation of different parts of the island, but there is evidence that the borer is more serious in the sections receiving high rainfall than in the drier parts of St. Kitts. This is in accordance with results secured by the writer elsewhere.

But there seems to be a greater loss through a given attack in the drier parts of the island than in the wetter, because, with more favourable conditions the plants can recover more from the attack. Rind disease, though present—often to marked degree—in the wetter parts of St. Kitts, seems to work more havoc among canes in the dry zones, hence its effects are attributed by certain planters to "drought."

The losses due to Diatraea saccharalis in St. Kitts—As elsewhere the damage done by the borer in St. Kitts may be classified under two heads, field and factory. In the field, there is not only a direct loss in the number of canes per stool, but also a substantial reduction in weight of saleable canes, due directly to borer attack. Certain heavily infested fields were observed where at least 33% of all the canes had been killed outright as a result of successive attacks by

The * indicates that the average was raised by one field:—32% joints.

Diatraea, and in these same fields could be found a considerable quantity of "rotten" canes which are entirely lost to the factory. Exact figures based on the examination of similar fields in Antigua, show that the loss under such conditions amounts to over 9 tons of cane per acre. The most conservative estimate of the field losses sustained in St. Kitts is probably about 3 tons per acre for every acre under cultivation. This does not take into account the injury to cane-stools resulting from secondary attack by fungi, etc. The factory loss is hardly less severe, and is two-fold in nature, first of all there is a direct loss in quantity of juice per ton of cane, and secondly, what is perhaps more important from the point of view of sugar fabrication, there is a definite reduction in the quantity of sucrose in the juice proportionate to the degree of infestation of the joints. Details of the former have yet to be ascertained, but preliminary experiments conducted in Antigua by the writer in collaboration with Mr. M. More, Chief Chemist of the Antigua Sugar Factory, indicate that an average of 16% joint infestation is associated with direct loss of 3% sucrose in the juice. This loss in St. Kitts is probably closer to 2.5%. Borer infestation probably fluctuates annually but taking the present harvest as typical, the financial losses sustained in St. Kitts through the direct agency of the moth-borer are somewhere in the neighbourhood of from £10,000 to £12,000 annually.

Parasites of Diatraea saccharalis in St. Kitts.—The egg-parasite *Trichogramma minutum* occurs everywhere, and parasitism of eggs by it frequently reaches a high percentage, as in Antigua, however, there is little probability that this insect has much real effect in controlling borer under estate conditions. The other egg-parasite, *Prophanurus alecto*, was not seen by the writer in St. Kitts.

Dr. Myers was the first to show that there occurs in St. Kitts the larval parasite *Microdus stigmaterus*, he states (loc. cit. p.98) that 3.3% of the borers are killed by this wasp in that island. Adults were seen occasionally flying in the canefields but on one occasion only was the writer able to make an estimate of the parasitism: At Wingfield, a field of cane was found very heavily attacked by *Diatraea*, as many as seven or eight dead-hearts being found per cane-stool, on 29th January 150 infested canes were cut from this field and examined, 36 borers in all stages (26 larvae and 10 pupae) were found, and two *Microdus*, (1 larva and 1 pupa) 10 empty pupa-cases of *Diatraea* and 1 empty cocoon of *Microdus* were also found, the parasitism by *Microdus* on this occasion was 5.3%.

The fungus parasite of the larva, *Cordyceps barberi*, was noted but no estimate made of its abundance, it is, however, far less common in St. Kitts than in Antigua.

The control of Diatraea saccharalis in St. Kitts.— Various planters informed the writer that from time to time in the past various attempts have been made to control the borer by means of trap-lanterns placed in the fields or by the cutting out of dead-hearts from the young fields. There is no evidence, however, that these measures resulted in a diminution in the numbers of the pest.

Whilst it is highly desirable for detailed experiments to be conducted in the island to ascertain the value of various measures, the time seems ripe for the trial of biological control by means of the Cuban tachinid fly. *Lixophaga diatraeae*. Both Dr. Myers and the writer have for some years urged the advisability of importing this fly into the Leeward Islands and elsewhere in the West Indies, since it is beyond all measure the most promising enemy of the borer known to be adapted to similar climatic conditions.

Lixophaga diatraea is a small fly, superficially somewhat resembling the common house-fly, belonging to a family the members of which are parasites upon other insects, this particular species is not known to attack any insect other than the sugar-cane moth-borer. It is limited in its natural distribution

to the Greater Antilles, where it is known to occur in Cuba, Jamaica, Haiti, Santo Domingo and Porto Rico, this range covers zones which are ecologically similar to the Leeward Islands inasmuch as sugar-cane cultivation is concerned. The fly is far more abundant in Cuba than in any of the other islands where it occurs, and Dr. Myers has shown that the parasitism of borers in that country amounts to 34.5% and "In the fields where some 800 Lixophaga were collected . . . . the averag parasitism was 45 per cent," *Lixophaga* attacks *Diatraea* in the larval stage, and can follow its host from cane to cane and from field to field. Its effectiveness in Cuba, however, is reduced because it is in its turn attacked by certain species of hyperparasites, with which, of course, it would not have to contend were it introduced into the Leeward Islands.

That *Lixophaga* exerts a powerful control over the borer in Cuba is shown by other means than direct measure of parasitism by it, for Van Dine has shown (Trop. Plant Res.Foundn Bulletin No. 2. 1916) that the infestation by *Diatraea* on all properties varied from 0% to 94% of the canes, the average on any one property being from 8% to 32% (compare Antigua with 75.5% and St. Kitts with 79.7%). Myers shows the infestation of stalks in Cuba to be 20%.

So far as the island of St. Kitts is concerned, the need for an early effort to be made to control *Diatraea* has been amply demonstrated. With the absence of a resident entomologist to advise some other means therefore, the introduction of Lixophaga should come foremost as a possible means of control. Whilst no entomologist could guarantee that the parasite would become established and exert the same influence in St. Kitts that it does in its native home, it may be stated that there is no reason yet apparent why it should not do so, and that the chances of its success are much greater than those of its failure.

The losses through the borer in St. Kitts are sufficiently serious to warrant every possible means being tried to effect a reduction, and biological control by means of *Lixophaga* is the most promising angle of attack known to us at present. When it is realised that the losses are repeated, if not actually increased, annually, and that the cost of financing the project outlined is a capital charge, the latter becomes insignificant by comparison with its possible benefits.

THE COTTON INDUSTRY.

Owing to the severe drought in March the cotton crop was not planted until about the 15th April. The crop was a very poor one. Severe attacks of the cotton leaf worm, heavy infestation of the first crop bolls by the larvae of the pink bollworm and heavy rains at the time when the crop was maturing were responsible for the low yields obtained on all estates.

The area under cotton was reduced to about 1170 acres as a result of the unsatisfactory condition of the market for sea island cotton and the large stocks of cotton that most growers have on hand in England. The total crop amounted to 129,894 lb. of lint, a yield of about 111 lb. of lint per acre. The percentage of stained cotton was very high, about 17 per cent.

According to the customs returns the export of cotton from the Presidency for the year ended 31st December, 1931, was 245,511 lb. lint valued at £12,364.

Nevis and Anguilla.

Reports on the cotton industry in Nevis and Anguilla are given in the reports of the Agricultural Instructors of these islands.

COTTON SELECTION.

ST. KITTS.

Fifteen progeny rows were grown. The results of lint analysis and examination of plants in the field indicated that the four rows 2—3—30, 14—3—30, 18—3—30 and 22—3—30 were the best and a large number of flowers in these rows were self-fertilised to obtain a supply of self-fertilised seed for planting the propagation plot in 1932.

The following results were obtained from an examination of 20 plants:

Mean Maximum Lint Length	Range	Lint per seed mgs.	Range	Seed Weight mgs.	Range
52	51—55	43	40—47	140	130—149

VEGETABLE GROWING FOR THE CANADIAN WINTER MARKET.

Planting of vegetables for export to Canada was started about the 1st October, 1931. About fifteen to twenty acres will be grown, chiefly tomatoes and string beans.

Two mall shipments of beans and egg plants were made to Messrs Mutual Brokers of Montreal in December. The brokers' report stated that the produce was received in poor condition. It is hoped that the best temperatures for carrying string beans and egg plants will soon be investigated by the Marketing Officer as it is likely that fairly large shipments of beans will be made early in 1932.

RETURN OF AGRICULTURAL PRODUCE EXPORTED FROM THE PRESIDENCY OF ST. KITTS-NEVIS FOR THE YEAR ENDED 31ST DECEMBER, 1931.

Article.	Quantity.		Value.
Sugar, crystals	10,576	tons	£110,234
Syrup and Molasses	589,690	gallons	5,759
Cotton, Sea Island	245,511	lb. lint	12,364
Cotton Seed	388	tons	1,363
Cotton Seed Oil	9,489	gallons	425
Coconuts	43,900		256
Copra	..		5
Salt	2,316	tons	2,505
Vegetables	140,464	lb.	2,450
Fruit	..		232
Tamarinds	..		22
Hides and Skins	14,420		357
Horses	29		184
Mules	147		888
Asses	66		59
Cattle	311		1,944
Sheep	166		11
Goats	49		18
Swine	28		3

EXPORTS OF SUGAR.

The following Table gives the Exports of Sugar from the Presidency for the 32 years 1900—1931.

Year	Tons	Year	Tons
1900	7,494	1916	16,106
1901	12,146	1917	15,048
1902	16,624	1918	9,105
1903	13,511	1919	11,015
1904	12,225	1920	12,483
1905	12,042	1921	10,592
1906	15,191	1922	9,648
1907	14,178	1923	10,717
1908	11,044	1924	9,699
1909	12,027	1925	15,043
1910	12,510	1926	15,651
1911	11,139	1927	17,363
1912	10,554	1928	18,610
1913	11,312	1929	12,736
1914	9,946	1930	17,637
191[illegible]	8,311	1931	10,579

EXPORTS OF COTTON.

The following table gives the exports of cotton lint from the Presidency for the twenty-five years ended September 30, 1931.

Year.	St. Kitts lb.	Nevis lb.	Anguilla lb.	Total. lb.
1907 ..	180,917	96,402	61,666	338,985
1908 ..	241,006	211,431	76,200	528,637
1909 ..	207,146	104,250	49,320	360,716
1910 ..	231,150	129,973	43,400	404,523
1911 ..	329,322	344,395	148,595	822,312
1912 ..	332,168	165,329	97,142	594,639
1913 ..	374,594	166,477	112,138	653,209
1914 ..	372,633	268,542	94,372	735,547
1915 ..	397,567	305,154	33,750	736,401
1916 ..	131,859	99,173	49,620	280,652
1917 ..	106,265	196,915	49,399	352,579
1918 ..	2,457	187,748	652	190,857
1919 ..	422,681	307,212	47,869	797,762
1920 ..	288,720	292,627	61,543	642,890
1921 ..	23,970	422,120	nil	446,090
1922 ..	228,612	225,851	50,120	504,583
1923 ..	29,256	510,919	nil	540,175
1924 ..	81,590	234,957	23,342	344,907
1925 ..	185,607	81,844	nil	267,451
1926 ..	297,023	126,014	4,337	427,374
1927 ..	220,095	224,588	nil	444,683
1928 ..	161,360	113,492	1,506	276,358
1929 ..	250,357	436,892	23,463	710,712
1930 ..	365,811	286,791	26,505	679,107
1931 ..	235,668	161,922	31,310	428,900

PLANT LEGISLATION.

Ordinance No. 3 of 1907. "The Fumigation of Plants Ordinance" enforces the fumigation of all imported plants at the discretion of the local Agricultural Officer.

Ordinance No. 18 of 1918. "The Cotton Ordinance" regulates the planting of cotton and provides for the destruction of cotton plants.

Ordinance No. 6 of 1923. "The Cotton Ordinance Amendment Ordinance" provides for the inspection of land before the planting of a new crop.

Ordinance No. 2 of 1923. "The Plant Protection Ordinance" provides for the prevention and eradication of diseases and pests affecting vegetation.

Proclamation dated the 21st August, under the Plants Protection Ordinance, 1923, prohibits the importation of fruits, suckers and every part of the Banana from all places except Barbados, St. Vincent and the Leeward Islands; Coconuts and Coconut Palms from Grenada, St. Vincent, Trinidad and Tobago, Cuba, Jamaica and the countries of Central and South America; Citrus Plants and Fruits from the United States of America, Cuba, Jamaica, Haiti, the Dominican Republic and Porto Rico; Soil from all places; Sugar Cane and all parts thereof, cotton seed and seed cotton from all places without the written authority of the Governor.

Ordinance No. 11 of 1930. "The Exportation of Fruit Ordinance," regulates the examination and exportation of fruit, prohibits the shipment of defective fruit and makes provision for the export of fruit.

Statutory Rules and Orders, No. 1 of 1931. "The Exportation of Fruit Rules, 1931."

METEOROLOGY.

The following are summaries of the observations recorded at the Experiment Station, La Guerite, during the year under review.

Barometric Pressure. During 1931 the mean pressure, corrected for temperature and gravity and reduced to sea-level, at 9 a.m. was 29.995 and at 3 p.m. 29.930, the highest recorded being 30.117 on April 4th and the lowest 29.726 on November 18th.

Temperature. The mean maximum temperature for the year was 84.3°F. and the mean minimum 74.3°F. The maximum extreme for the year, 89°F. was registered on June 10th and the minimum extreme, 68°F. on February 23rd. The mean average temperature was 79.3 F and mean monthly range 16 F.

Humidity. The mean relative humidity was at 9 a.m. 75.2% and at 3 p.m. 74.7%.

Rainfall. The total rainfall measured at the Experiment Station was 50.30 inches. This fell on 163 days, the greatest fall being 1.78 inches on November 27th. The total average rainfall for the year 1931 from 31 stations was 57.60 inches; the average rainfall of the island for the years 1914 to 1931 being 53.80 inches.

Latitude 17° 20′ N.

Longitude 62° 45′ W.

METEOROLOGICAL REPORT FOR 1931.

AGRICULTURAL DEPARTMENT, ST. KITTS.

Heights above M. S. L. } Barometer 157 feet; Rain Guage 152 „

Months.	Barometric Pressure reduced to Sea-Level. 32° Fahrenheit and corrected for gravity.					Temperatures.								Vapour Pressure Ins. of Mercury.			Relative Humidity per cent.			Inches Rainfall.	No of days on which rain fell.
	9 a.m.	3 p.m.	Mean	Highest.	Lowest	Maximum Means.	Minimum Means	Maximum Extreme.	Minimum Extreme	Mean for Month.	Range for Month.	Dew Point 9 a.m.	Dew Point 3 p.m.	9 a.m	3 p.m.	Mean.	9 a.m.	3 p.m	Mean.		
January ..	30 035	29·958	29·996	30 097	29·907	82 0	70·9	84	66	76·4	18	69·2	70·8	·718	·747	·732	72·5	70·9	71·2	0·66	10
February ..	29 994	29·918	29·956	30·069	29 85[illegible]	82 2	71·3	85	69	76·7	16	67·6	71·0	·737	·771	·754	73 5	72 5	73·0	1·32	10
March	30·015	29·948	29·981	30·111	29 879	84·3	72·7	86	70	78 5	16	70·8	72 8	·762	·801	·781	74 0	72·5	73·2	0·37	5
April	29·983	29·922	29 952	30·117	29 847	83·6	74·7	86	70	79·1	16	72·2	73 2	·804	·834	·819	75 5	76 0	75·7	5 99	11
May	29·960	29 923	29·941	30·04[illegible]	29·887	85·5	75·5	87	71	80 5	16	74·8	77 0	·896	·934	·915	78 5	79 0	73·7	5·80	13
June	30 028	29·983	30·005	30·083	29·904	86·9	77 2	88	73	82·0	15	75·2	76·8	·896	·925	·910	76·0	73·5	74·7	3·47	13
July	29 987	29 947	29·967	30·092	29 885	86 1	75 8	87	71	80·9	16	75 0	75·2	872	·896	·884	74·5	76·0	75 2	4 11	20
August	30·031	29 982	30·008	30·104	29 894	85·2	76·7	88	71	80·9	17	74·0	76·7	·851	916	·883	74·5	74·5	74 5	6·25	14
September ..	29·994	29 895	29·944	30·083	29·764	85·0	75·6	87	72	80 3	15	75·2	75·0	·884	·875	·879	77 5	72·0	74·7	4·25	17
October ..	29 960	29·890	29·925	30·013	29·856	86 3	75 7	88	73	81·0	15	76·0	77·0	·904	·940	·922	79·0	77 0	78 0	2·71	15
November ..	29·921	29 844	29 882	29·995	29·726	84·5	74·0	87	68	79 2	19	74·2	75 2	·864	·875	·869	76·5	79 8	78·1	10·05	18
December ...	30·040	29·954	29·997	30·099	29 883	81·1	72·6	83	69	76·8	14	69 0	71·0	·756	·768	·762	70·5	74 2	72·3	5·32	17
Means ...	29 995	29·930	29 962			84·3	74·3	86·4	70 0	79·3	16·1	72·7	74·3	·829	·857	·843	75·2	7 4·7	74·5	50 30	163

R. E. KELSICK,
Agricultural Superintendent,
26th January, 1932.

RAINFALL RETURN FOR ST. KITTS FOR YEAR 1931.

Estate.	January.	February	March,	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Cranstouns ..	1·90	3·66	0·95	4·31	13·80	7·64	9·24	7·72	5 40	4·62	12· 75	6·83	78·82
Lodge ...	1·18	1·15	1·74	6·41	9·26	5·83	6.27	9·12	8·97	8·58	11·53	5·48	75·52
Willets ..	0·34	3·07	3·03	8·44	8·04	11·61	3·96	6·32	5·50	5·92	11·80	7·24	75·27
Belmont ...	1·02	3·18	1·85	9·13	10·79	8·64	3·57	6·72	5·61	5·38	10·76	6·41	73·06
Wingfield ...	0·76	2·91	0·84	3·36	10·02	5·49	6·28	7·84	6·19	5·54	12·86	7·25	69·34
Parsons ..	1·02	2·83	1·13	7·22	6·96	6·52	4·65	6 83	5·83	6·23	12 42	5·81	67·45
Caines ..	0·70	1·91	1·58	7·87	7·81	8·15	4·54	6·97	6·18	5·53	10·81	4·49	66 54
La Vallee .	1·85	2·97	0·47	4·67	9·10	5·32	7·65	7 02	5·74	4·15	11·75	5 80	66·49
Molineux ..	1·43	1·56	1·30	6·20	8·06	6·24	5·07	6·93	7·08	5·89	10·38	5·43	65·57
Mansion ...	1·27	0·77	0·68	4·63	9·56	5·96	5·68	7·13	5·96	6·54	11·61	5·48	65·27
Sir Gillies ..	0·55	1·45	0 95	3·12	8·14	8·58	6·30	5·03	4·80	4 39	11·30	8 11	62·72
Brighton ..	0·92	0·91	0·90	6·65	6·96	5·01	4·83	7 28	6·59	7·03	9·71	5 17	fl1·96
Estridge ..	1·05	0·87	1·07	5·68	8·28	5·05	5·23	6 79	5·86	5·27	10·98	4 03	60·16
Brotherson ...	0·00	2·23	0.87	8·36	8·72	5·18	4·82	6·28	3·91	4·97	9·56	4 66	59·56
Belle Vue ...	0·83	1·25	0·71	6·65	7·31	5·06	4·48	4·69	5·37	4·60	12·14	5 95	59·04
Hermitage ...	0·72	0·56	0·51	4·46	6·86	4·55	4·07	6·58	5·35	5·95	14·30	4·06	57·97
Bourkes ...	0·43	2·65	0·39	5·13	7·38	6·60	4·96	6·24	4·65	3·70	9·95	5 76	57·84
Stapleton ...	1·87	0·83	0·30	6·25	3·70	3·80	5·10	8·88	5·92	4·78	1·28	4·06	56·77
Mills ..	1·16	0·99	1·49	5.84	6·79	4·33	4·24	5·76	5·44	4·46	9·13	4·34	53·97
Cunningham ..	0·67	0·99	0·85	4·24	6·01	4·97	5·15	6·77	5·08	4·88	9·44	4·80	53·85
Needsmust ...	0·95	1.00	0·30	3·40	7·91	3·55	6·65	4·75	5·95	3 00	7·85	6 55	51·86
La Guerite ..	0·66	1·32	0·37	5·99	5·80	3·47	4·11	6·25	4·25	2·71	10·05	5·32	50·30
Douglas ..	0·53	1·94	0·50	5·39	3·72	4·02	5·77	5·55	6·32	2·72	9·28	3·91	49·65
Buckleys ..	0·35	1·14	0·36	5·57	5·81	3·60	4 31	5·20	4·66	2·36	10.78	5·04	49·18
Lower Bourryeau	0·80	0·75	1·29	5·48	5·88	4·12	3·84	5·00	4·92	4·51	8·10	4 04	48·73
St. Kitts Factory	0·60	1·29	0·23	4·32	5·92	4·02	4·39	5.81	4·51	2·50	7·55	4 10	45·25
Frigate Bay ..	0·49	0·82	0·25	3·10	4·76	5·00	3·32	4·78	4·57	3·60	6·99	3 17	40·85
Canada ..	0·85	0·50	0·60	1·61	4·40	4·08	4·66	4·29	4·00	3·74	8·44	3·96	41·13
Pond ..	0·05	1·53	0·20	3·33	6·25	3·17	3·68	4·72	5·05	1·77	6·65	4·04	40·44
West Farm ...	0.00	0·65	0·18	4·54	4·73	3·09	3·05	3.44	5·59	1·44	8·90	4·76	40·37
Conaree ...	0·40	0·52	0·04	2·59	3·80	5·62	3·24	4·84	4·67	3·69	8·16	3·31	40·88

AVERAGE RAINFALL 1914—1931.

In 1914 the average rainfall on 31 stations was 52.92 inches.

1915	„	„	32	„	„	75.59	„
1916	„	„	35	„	„	69.51	„
1917	„	„	33	„	„	43.53	„
1918	„	„	30	„	„	52.44	„
1919	„	„	29	„	„	62.84	„
1920	„	„	28	„	„	37.13	„
1921	„	„	29	„	„	47.09	„
1922	„	„	33	„	„	44.84	„
1923	„	„	30	„	„	34.58	„
1924	„	„	28	„	„	68.13	„
1925	„	„	32	„	„	43.54	„
1926	„	„	27	„	„	62.57	„
1927	„	„	29	„	„	64.36	„
1928	„	„	29	„	„	53.25	„
1929	„	„	28	„	„	52.55	„
1930	„	„	31	„	„	45.98	„
1931	„	„	31	„	„	57.60	„

The average rainfall for 18 years is 53.80 inches, so that the rainfall for the year 1931 is 3.80 inches above the average.

AVERAGE MONTHLY RAINFALL.

	1931	1914—1931
	Inches.	Inches.
January ..	0.81	3.02
February ..	1.55	2.06
March ..	0.83	2.62
April ..	5.28	4.05
May ..	7.17	3.90
June ..	5.42	4.06
July ..	4.93	4.97
August ..	6.17	5.44
September ..	5.48	5.86
October ..	4.53	6.51
November ..	10.23	6.52
December ..	5.14	4.55

DETAILS OF ADMINISTRATION.

EXPENDITURE AND REVENUE.

EXPENDITURE.

	£	s.	d.
Personal Emoluments	567	10	0
Travelling Allowances	75	10	5
Experiment Stations	152	19	11
Sugar Cane, Cotton and other experiments	198	1	4
Apparatus, chemicals and books	33	14	6
Contingencies	16	10	8
Destruction wild cotton and cotton pests	14	13	0
Government Cotton Seed Farm	457	8	6
Upkeep of Zebu Bulls	37	11	5
Purchase of Black Head Persian ram sheep	18	18	2
Exhibitions	8	7	1
Demonstration Plot, Anguilla	65	6	0
Total	£1,646	11	0

REVENUE.

	£	s.	d.
Experiment Stations	£ 25	12	3
Government Cotton Seed Farm	104	1	6
Demonstration Plot, Anguilla, ...	5	5	6
Total	£134	19	3

STAFF CHANGES.

Mr. G. B. Gregory, a graduate of the Imperial College of Tropical Agriculture, Trinidad, was appointed to the staff as Assistant Agricultural Officer. Before assuming his duties in St. Kitts Mr. Gregory spent two weeks in St. Lucia studying plant propagation methods.

Mr. R. Lance resigned his appointment as Assistant Clerk and Mr. M. M. Marsh was appointed in his place.

OFFICIAL VISITS.

Visits were paid to the station during the year by His Honour the Administrator, Professor H. A. Ballou, Commissioner of Agriculture, Mr. G. A. Jones, Assistant Commissioner of Agriculture, and Mr. A. C. Shill, Marketing Officer.

Mr. S. H. Evelyn, Cotton Officer, St. Vincent, visited the island in connexion with the cotton breeding work carried on at the Experiment Station.

Report of the Agricultural Instructor, Nevis

for the period from April 1st to December 31st, 1931.

WORK IN THE NURSERY AND DISTRIBUTION OF PLANTS.

The ornamental border and hedges have been kept in good order during the year.

In the nursery, the work in connection with the raising of fruit trees by grafting and budding was continued.

The total number of plants distributed during the year was as follows:—

Ornamental plants	45
Gliricidia	450
Guava	64
Garden Grapes	43
Grafted Limes	37
Bread Nuts	22
Pomegranate	21
Papaw	16
Grafted Mangoes	6
Pears	6
Budded Oranges	7
Casuarina	2
Tangerine	1
Granadilla	1
Total	721

PLOT EXPERIMENTS.

As in the past experiments with various economic and food crops were carried out at the Experiment Station and seeds and cuttings of the varieties which gave best results were distributed about the island.

The following is a list of seeds and cuttings distributed from the station during the year:

Sweet Potato	.. .. ..	10,400 cuttings
Cane Plants	.. .. ..	1,800 „
Yams	.. .. ..	150 lb.
Seed Corn	.. .. ..	50 „
Peas and Beans	.. .. ..	29 „
Selected Cotton Seed	.. ..	3,997 „

VEGETABLE NURSERY.

In connection with the development of the Vegetable Industry a small nursery was established at the Experiment Station for the purpose of supplying vegetable seedlings to growers. The seeds were germinated and the seedlings supplied at a price just to cover the cost of the seed.

The following is a list of the seedlings distributed:—

Tomato (Marglobe)	.. .. ..	89,140
Egg-plants	.. .. ..	7,040
Onion	.. .. ..	204,450
Sweet Pepper	.. .. ..	120
Cabbage	.. .. ..	1,000

DEMONSTRATION PLOT.

The demonstration plot was continued as a model peasant holding and the following crops were grown during the year under report:—

Plot A	.. ..	Pasture
Plot B	.. ..	Cotton
Plot C	.. ..	Late vegetables
Plot D	.. ..	Early vegetables
Plot E	.. ..	Ground provisions

Plot A (Pasture)

After the cotton crop was reaped last season the plot was thoroughly cleaned up and allowed to grow in grass and weeds for pasture.

Plot B (Cotton)

After the vegetable crop was reaped last season the plot was planted in New Era peas as a green dressing. The green dressing was turned under during the month of August, 1931, and the plot planted in cotton on October 7th, 1932. The seed germinated well and the crop made rapid progress. During the months of November and December the crop was attacked by the cotton leaf worm and pink bollworm was observed very early in the season.

The plants are bolling fairly well but with a heavy attack of pink bollworm so early in the season it is expected that the yield will be seriously affected.

The cost of the crop to December 31st was £7. 6. 0.

Plot C (Sweet Potatoes, Onions, String Beans and Tomatoes)

This plot was previously in ground provisions. After the ground provisions were reaped the plot was allowed to run idle until August when preparation was started.

The plot was divided in four and the following crops planted in October, 1931: Sweet Potatoes, Onions, String Beans and Tomatoes. The cost of this plot up to December 31st, 1931, was £9. 2. 4.

Plot D (Tomatoes and Egg-plant)

This plot was planted in Tomatoes and Egg Plants on October 7th, 1931. The tomato crop was very promising, but the heavy rains during the month of December caused a great deal of damage to the partly matured fruits, especially in the part of the plot which was unstaked. The Egg Plants grew fairly well but the fruits were small and perhaps unsuitable for the Canadian market.

In order to compare results from staked and unstaked tomatoes, on part of this plot the tomatoes were left unstaked, but with brushwood placed under the vines to keep the fruits from contact with the soil and on part the tomatoes were staked. Results are not yet available but it would appear that the bearing is better on the unstaked part but there was a greater percentage of damaged fruits, and during the damp weather in December a very great percentage of the fruits in the unstaked part rotted and it appears that the fruit rotted not only from being in direct contact with the soil but also from being close to it.

The cost of the plot to December 31st was £10. 13. 8.

Plot E

This plot was previously in pasture. Between May and August the plot was planted in Yams, Cassava and Sweet Potatoes. The crops are all doing well and promise to give good yields.

COTTON SELECTION.

Work on cotton selection was continued on the same lines as in previous years, but results of this season's selection are not yet available.

WORK IN CONNECTION WITH INSECT AND FUNGUS PESTS AND DISEASES AND THEIR CONTROL.

Sugar Cane

Mosaic and Gumming Disease. No trace of these diseases was observed during the year.

Moth Borer. This insect continues to be the most serious pest of the sugar cane. In almost all the fields, it is observed that a fair percentage of the crop is more or less severely damaged by this pest.

Cotton.

The cotton leaf worm (*Alabama argillacea*) was not as troublesome as it had been last season.

Pink Boll Worm. This pest appeared to a fairly great extent early in the season and it is expected that the crop will be severely damaged by it.

Cotton Stainer. This pest had been fairly well under control during the past five or six years, and was hardly observed except towards the end of the cotton season. This season it made its appearance as early as December 1931.

The cleaning up of the cotton fields had not been so satisfactory as in the past.

The fumigation of cotton seed at the ginneries has been carried out in accordance with Regulations.

Vegetables.

The cut worms Prodenia and Protoparce were not as troublesome as they were last season.

Scarabee (*Cryptorhpnchus botatae*) is on the increase and caused a great deal of damage to the potato crop this sason.

Green Bug (*Nezara*) was observed in some of the plots of Tomatoes during the month of December.

Insecticides.

A supply of Paris Green and Lime was again put in stock at the Experiment Station for the benefit of the small growers. Paris Green and Lime was supplied to 40 growers and the quantity supplied was 67 lb. of Paris Green and 2 bags of Lime.

Disinfection and Fumigation of Plants and Seed.

In accordance with the provisions of the Plant Protection Ordinance, 13 consignments of plants and seed were received at the Experiment Station for fumigation.

PROGRESS OF CHIEF INDUSTRIES.

The 1930-1931 cotton crop was all reaped by the end of June 1931 and the total production was 159,102 lb. lint from about 1500 acres being at the rate of 106 lb. lint per acre.

The acreage planted in cotton during the season under report was about 250 acres. The crop was planted during the early part of October, 1931. The seed germinated well and the crop made rapid progress. Up to the middle of December there was every prospect of a good crop as the plants were well grown and bolling fairly heavily, but towards the end of December it was discovered that the crop was severely attacked by the pink boll worm, which destroyed all hopes of a good crop. The crop was also attacked by the cotton stainer and leaf worm, but not very much damage was done by these pests, although the growers were a little indifferent in handling the pests.

Sugar Cane

The cane crop on the whole is fairly promising, and the muscovado mill erected on the Windward part of the island will be in operation during the coming season. The erection of this mill has had the effect of reviving the cane industry in that part of the island.

Coconuts.

The condition of the coconut plantations is satisfactory. At Pinneys the weeds have been cutlassed and the fallen branches collected and either buried or burnt. This has considerably improved the appearance of the plantation.

Progress in Minor Industries.

Although the price of live stock has fallen considerably, yet the live stock industry has proved of greatest importance to the island.

Weather conditions were more favourable during the year under report and the stock were maintained in better health and condition. There has been some improvement in pasture conditions, especially at Indian Castle where large fields of Sour Grass have been planted.

The Government's Black Head Persian Ram was sent over to Nevis in September, 1931. He is now on service at Indian Castle and has served one month at Jessups estate. He is in good health and condition.

The Government Zebu Bulls are now stationed at Round Hill and Indian Castle estates, and they are both in good health and condition.

Ground Provisions and Vegetables.

The usual ground provisions were planted during the year, and on account of the very favourable weather, the crops produced abundantly. The acreage planted in vegetables for the Canadian market was much less than was expected. The plots however are looking fairly promising.

The first shipment of vegetables was made on Dec. 31st when 139 crates of Tomatoes, 15 crates of String Beans and 5 crates of Egg plants were shipped to Messrs Mutual Brokers, Montreal.

Extension of Interest in Agricultural Matters.

The Government Vegetable Bureau and Cold Storage accommodation is in operation this season. The cold storage will be of great benefit to the growers in averting loss of produce, which otherwise would be on account of the infrequent opportunities to make shipments.

Purchasing of Peasant's Cotton and Government Ginnery.

Purchasing of peasant's cotton on a co-operative basis was started by the Government on April 1st, 1931. An advance of 5 cents per lb. was paid

to the peasants on delivery of the cotton and only clean sea island cotton was received. Purchasing was carried on at a warehouse rented at Charlestown and the cotton was ginned by contract at the Fine Spinners Ginnery. The total quantity of cotton purchased was 160,598 lbs of seed cotton and the lint obtained from it was 44,096 lbs. which was shipped to the British Cotton Growing Association on June 19th in 88 bales. The seed was sold to Messrs H. F. Wildy & Co., except a supply of the best which was hand selected and sold to growers to plant the 1931-32 crop. Fortunately an early sale of all the cotton shipped was effected at a price which allowed a bonus of 1.836 cents per lb. to the peasants after expenses were deducted. The total cost of the undertaking was £2,358. 12. 7. and the gross receipts from the sale of cotton and cotton seed was £2973 1. 3. leaving a profit of £614. 8. 8. to be divided between the peasants at the rate of 1.836 cents per lb. on seed cotton.

The Government subsequently acquired the Ginnery from the Fine Spinners. In this matter it is felt, especially by the small growers, that the Government has taken a step in the right direction and is supplying a long felt need of the island. The work in connection with the purchasing of the cotton was carried out by the Agricultural Instructor.

Land Settlement.

In connection with the Land Settlement scheme for peasants, Government purchased Low Ground Estate. The estate is about 500 acres and extends from the sea coast on the west to Pond Hill, Gingerland on the East passing through the villages of Brown Hill, Bailey Yard and Cole Hill. The Eastern part as far down as Brown Hill is divided into 67 holdings of about 3 acres each. The Lower part, about 200 acres, is reserved for pasture. The estate is well adapted for a settlement and were conditions normal the holdings would be all taken up readily. Under present conditions the peasants feel that, with the market so uncertain for Sea Island Cotton and Sugar—their main cash crops—and no regular employment, it might be difficult for them to meet their instalments. Never-the-less they realise that the scheme is greatly to their advantage.

AGRICULTURAL EDUCATION.

Work on school gardens is carried on at nearly all the primary schools, but generally there is much room for improvement.

AGRICULTURAL MATTERS.

The usual correspondence in connection with the work of the Department has been carried on.

Regular visits are paid by the Agricultural Instructor to the estates and peasant's plots in the different parts of the island and advice as to crops and to methods of dealing with pests offered.

The Agricultural and Commercial Society of which the Agricultural Instructor is Honorary Secretary held three meetings during the period under report and the following were the chief matters discussed:— Remission of Export duty on Cotton, Advances on Tomatoes grown for shipment, Close Season for cotton.

OFFICIAL VISITS.

Visits were paid to the Station, by Professor Ballou, the Commissioner of Agriculture, Mr. G. A. Jones the Assistant Commissioner of Agriculture, Mr. R. E. Kelsick, the Agricultural Superintendent, and Mr. G. B. Gregory, the Assistant Agricultural Superintendent.

Publications Received.

The following publications have been regularly received and are hereby gratefully acknowledged,— The Journal of the Imperial College of Tropical Agriculture, Journal of Agricultural Research, and the Experiment Station Record, United States Department of Agriculture, Journal of the Empire Cotton Growing Corporation, Journal of the Agricultural Society, Jamaica, Report of the local Department of Agriculture, Barbados, Report of the Experiment Station Porto Rico, Report of the Agricultural Department, Bermuda, Climatological Report San Juan, Porto Rico.

Repairs to Buildings.

No repairs were done at the Station during the year.

STAFF CHANGE.

There was no change of staff during the year.

METEOROLOGICAL RETURNS.

The total rainfall for the period under report from April 1st to December 31st., 1931 was 45.16.

Rain fell on 120 days during the period, and the heaviest fall recorded for any one day was 2.50 inches on September 1st, 1931. The following Tables show the monthly rainfall at the Experiment Station for the period under report and also that for the past twenty-six years 1906—1931.

Month.	Rainfall. Inches.	No. of days on which rain fell.	Maximum fall for any one day.
1931.			
April	4.00	8	
May	2.13	7	2.36 (21st)
June	3.20	13	.66 (4th)
July	5.68	14	1.28 (1st)
September ..	6.59	13	.78 (20th)
August	6.94	17	1.43 (17th)
October	5.90	14	2.50 (1st)
November ..	6.83	16	1.08 (10th)
December ..	3.89	18	1.73 (12th)
			.72 (7th)
	45.16	120	

Temperature.

Readings of the Maximum and Minimum and the Wet and Dry bulb thermometers are taken daily at the Station at 9 a.m. and 3 p.m.

The mean Maximum temperature for the year was 86.2 and the mean minimum 76.4. The highest maximum for the year was 90°F. registered on June 12th, August 6th and October 23rd, and the lowest minimum 69° F. on April 14th.

The mean average temperature for the year was 83.2.

RAINFALL AT THE EXPERIMENT STATION, NEVIS, FOR THE PAST TWENTY-SIX YEARS 1906–1931.

	January	February	March	April	May	June	July	August	September	October	November	December	Total
	Ins.	Ins	Ins.	Ins	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
1906	3·28	2·22	1·71	2·19	3·49	7·30	4·11	2·94	18·93	3·10	3·42	6·67	60·11
1907	3·22	2·32	1·23	1·08	3·30	4·12	4·86	2·64	3·76	6·92	2·54	7·46	43·45
1908	2·58	1·70	7·16	2·18	4·24	2·83	3·34	5·02	6·98	1·44	6·93	6·10	50·50
1909	3·86	3·46	·96	2·72	1·62	9·52	4·52	8·71	3·46	7·38	2·44	2·74	50·69
1910	5·24	3·82	1·33	·41	1·08	4·24	2·80	7·10	7·00	1·86	3·32	4·68	41·91
1911	6·38	2·78	2·32	4.02	4·08	·92	2·72	2·34	5.30	3·58	2·80	8·84	46·08
1912	3·84	·68	2·66	4·20	·79	2·51	3·56	3.46	3·19	5·25	6·43	2·85	39·42
1913	7·18	1·96	4·14	·81	4·47	2·23	1·77	4·92	3·59	3·89	4·41	3·36	42·64
1914	3·40	2·74	3·10	2·52	6·29	2·65	5·16	4·72	2·20	4·17	12·44	4·16	53·55
1915	4·40	2·03	·28	5·65	2·79	2·52	8·14	4·34	4·71	5·88	5·37	5·89	52·10
1916	4·53	3·99	2·19	·75	3·82	2.07	14·54	7·81	2·00	10·86	6·74	1·74	64.04
1917	1·39	3·28	2·57	1·00	4.27	6·73	3·46	4·02	8·18	5·00	2·11	2·09	44·10
1918	2·18	3·27	2.75	2·59	6·14	2·02	4·08	5·12	6·21	6·36	10·98	2·28	53·98
1919	2·22	1·16	1·33	2·79	2·10	2·29	4·02	1.66	2·10	8·41	7·22	2·89	38·22
1920	3·71	2·86	1·25	·02	1·22	2.22	1·79	4·61	6·05	6·76	3·30	4·39	38·18
1921	5·84	2·79	3·86	1·40	·82	·80	4·94	6·58	4·20	7·34	3·66	3·95	46·18
1922	1·75	1·80	4·71	3·33	1·95	3·09	4·05	3·88	6.84	4·27	2·14	5·81	43·62
1923	1·51	2·41	5·42	2·04	·45	5·62	1·85	2·63	1·16	5·28	4·23	3·16	32·74
1924	2·46	3·29	·05	2·49	1·58	2·48	4·50	24·35	4·05	5·11	3·57	4·71	58·64
1925	2·65	·99	1·49	1·06	1·61	1·92	3·53	4·81	4·12	6·94	2·74	·31	32·20
1926	2·08	1·97	1·78	3·42	11·77	2·92	3·89	4·94	6·24	7·15	3·62	6·59	56 37
1927	4·44	1·46	4·01	2·79	9 32	2·60	6·52	3·48	4·48	10·05	5·69	1·22	56 06
1928	2·87	2·10	3·21	3·78	1·31	3·96	4·06	2·59	*1·98	5·84	4·07	4·37	40.17
1929	3·92	2·52	5·38	2·12	3·10	2·58	6·95	5·21	2·69	3·45	5·07	5·57	48·56
1930	9·05	·63	·34	1·73	1·66	2·83	2·53	2·06	3·28	2·21	7·51	2·71	36·56
1931	1·00	1·47	0·37	4·00	2·13	3·20	5·68	6·59	6·94	5·90	6·83	3·89	48 00

The average rainfall for the last twenty-six years was 46.84 inches.
*Rainfall during hurricane of September 21, 1928, not available.

Report of the Agricultural Instructor, Anguilla.

For the Period 1st April to 31st December, 1931.

WEATHER CONDITIONS.

The total rainfall for the year 1931 was 44.47 inches which is 13.81 ins. more than that of last year. Rain fell on 106 days during the year and the heaviest fall recorded for any one day was 3.22 inches on the 12th November.

At another Station Wall Blake Estate, the rainfall recorded for the same period was 53.71 inches. The following table shows the monthly rainfall at the Demonstration Plot for the year under report.

Month.	Rainfall. Ins. Pts.	No. days on which rain fell.	Maximum Fall. Ins. Pts.	Date.
1931.				
January ..	.61	6	.13	7th, 1st
February ..	2.11	10	.30	25th
March ..	2.45	4	.85	29th
April ..	1.62	10	.66	3rd
May ..	4.26	9	2.08	11th
June ..	5.67	10	1.00	18th
July ..	2.19	10	.36	31st
August ..	4.46	9	2.87	9th
September ..	3.60	10	1.50	4th
October ..	4.20	10	1.12	12th
November ..	11.55	13	3.22	10th
December ..	1.75	5	.45	10th
Total ..	44.47	106		

WORK IN THE DEMONSTRATION PLOT.

Vegetables.

During the month of April the fencing of the plot was completed. The plot was divided up into 1/10 Ac plots—(10) eight of these plots were manured, the manure being a mixture of Sheep, goat, and Cattle manure purchased from the peasants here. The area enclosed, one acre, was prepared and made ready for planting.

A trial was made of String Beans but owing to a dry spell, the well water was used, the result of which proved very unsatisfactory. Apart from this the cut worm was prevalent and hand picking of this pest had to be resorted to. Another small worm was observed in the stem of the plant which ate its way through the stem leaving a hollow. The plants, though filled with pods, died before beans were matured. Repeated trials were made, the results being the same as already mentioned.

Egg Plants, the Black Beauty variety were tried and satisfactory results were obtained. No diseases of this plant were observed. The following Vegetable Seeds were received from the Agricultural Department, St. Kitts, and tried out.

Tomatoes, Cabbages, Turnips, Carrots, Lima Beans, Beet, Sweet pepper. A portion of these seeds were distributed to peasants, the balance sown in nursery boxes and beds.

Early in November Seedlings were put out in prepared beds and distributed to small holders. The seeds germinated well—the plants grew well and very good results were obtained.

It is to be regretted that owing to the want of a Storeroom it was impossible to furnish a true yield per acre.

Diseases and Insect Pests.

Tomatoes. Very few leaf eating worms were observed and these were easily controlled by hand picking. The Green Bug appeared towards the end of the crop and so no material loss was sustained.

Cabbages. Crickets were prevalent and numbers of these were picked daily. Their chief point of attack was the tender leaf.

Lima Beans. Severe attacks of the Bean leaf roller was observed, results therefore, being a complete failure.

There were no other diseases or fungus pests observed on the other vegetables.

Plant Distribution.

The following is a list of planting material distributed to peasants from the Demonstration Plot.

Potato Vines cuttings ..	10,100	
Onions	500	seedlings
Cabbages	200	„
Egg Plants	60	„
Tomatoes	48	„

Ground Provisions.

Three new varieties of yams were introduced in the island viz. Horn, Langy, and Lisbon. They were planted on the 2nd. May and are growing well. During the Xmas Season a trial was made and results very satisfactory. The yams are of a high quality and when fit will be stored for distribution to peasants the next planting season.

Irish Potatoes were planted in October— the Bliss Triumph variety. A Bordeaux mixture was sprayed on them. No diseases were observed. Cassava —a small plot 1/20 ac was planted in the month of May. They are doing well and it is hoped should give a good yield.

Black Rock Potatoes. These were handed over to the Agricultural Instructor by Mr. Carter Rey, they were cut up in bits and planted and the vines from these bits distributed. From results obtained it should prove a very good potato here.

Other varieties were collected locally, planted and distributed when there was a scarcity owing to drought.

Cotton.

1/10 ac plot was planted on 17th August. Plants grew well to a fairly uniform height. The Pink Boll Worm appeared in the month of December.

Onions.

A small plot of onions was planted and the yield was very good.

THE COTTON INDUSTRY.

The 1930–1931 crop yielded 32,244 lbs. lint which is 18,874 lbs less than that of the previous year. This was mainly due to insufficient rainfall. There were severe attacks of the Pink Boll Worm. For that reason no second crop was allowed to grow. The close season was fixed and attention directed to cleaning up and burning cotton. Planting for the 1931–1932 crop was started on the 17th August. There were attacks of the cut worm but these were controlled by hand picking. The weather was good and seeds germinated well. The rainfall during the Cotton growing season is given below.

August	.. ..	4.46 inches.
September	.. ..	3.60 ,,
October	.. ..	4.20 ,,
November	.. ..	11.35 ,,
December	.. ..	1.75 ,,
January	.. ..	3.07 ,,
Total	.. ..	28.43 ,,

The crop is estimated at 25,000 lbs. lint or 100 bales at 250 lbs. The Pink Boll Worm was very prevalent and it is feared will cause considerable damage

to the crop 1931–1932. Cotton seed for planting was obtained through the Agricultural Department from Nevis. The Cotton Worm (Alabama argillacea) was easily controlled this year by one application of Paris Green and Lime.

There were no attacks of Leaf Blister Mite observed.
Beetles were troublesome to young cotton trees and were hand picked.

OTHER CROPS.

The usual ground provisions were planted by the peasants, and owing to very favourable weather results were satisfactory.

Corn. Three new varieties were introduced into the island. A white corn known as Horse. Tooth and Field corn were imported by Mr. Rey and a Red corn received from the Agricultural Superintendent, St. Kitts.

The white varieties were severely attacked by corn car worm and greasy fly, and so failed. A portion of these were saved in the Demonstration Plot and will be tried out again when weather permits.

The Jamaica Corn turned out well and will be distributed to peasants.

Fruit. Two Julie mango slips (grafted) were received from St. Kitts. They were injured on passage across and are not doing very well.

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